

# 跨越两个串行物理层异步接口的多链路 PPP

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## 简介

在一些环境中，可能会需要使用聚合带宽将多条异步链路绑定为单一链路。本文档介绍如何配置思科 2500 接入服务器以使用虚拟模板捆绑两个异步接口。

此配置可用于通过异步线路与外置调制解调器连接或使用网络模块（内置调制解调器）的路由器。您可以根据需要向此配置中添加其他功能。

## 先决条件

### 要求

本文档没有任何特定的前提条件。

### 使用的组件

本文档中的信息基于以下软件和硬件版本。

- 实验室环境中清除了配置的思科 2511 和思科 2503 路由器。
- Cisco IOS® 软件版本 12.2(10b) 在这两个路由器上运行。
- 四个外置调制解调器。

本文档中的信息都是基于特定实验室环境中的设备创建的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您是在真实网络上操作，请确保您在使用任何命令前已经了解其潜在影响。

## 相关产品

此配置可用于任意两个各有两个 WAN 串行接口且都能配置异步接口的路由器。可以使用 WIC-1T、WIC-2A/S、8 或 16 异步端口串行接口。

## 规则

有关文档规则的详细信息，请参阅 [Cisco 技术提示规则](#)。

## 配置

本部分提供有关如何配置本文档所述功能的信息。

**注意：**要查找本文档所用命令的其他信息，请使用[命令查找工具](#)（[仅限注册用户](#)）。

## 网络图

本文档使用下图所示的网络设置。

## 配置

本文档使用如下所示的配置。

**注意：**此配置已使用 Cisco IOS 软件版本 12.2(10b) 在思科 2500 系列路由器上进行测试。相同的配置适用于运行 11.0(3) 及更高版本 Cisco IOS 软件的相似路由器拓扑。

### 路由器 1 ( 思科 2511 )

```
Current configuration : 1185 bytes
!
version 12.2
service timestamps debug datetime msec
service timestamps log datetime msec
!
hostname Router1
!
username Router2 password 0 xxxxx
ip subnet-zero
!
multilink virtual-template 1
!--- Applies the virtual interface template to the
multilink bundle. ! interface Loopback0 ip address
192.168.0.2 255.255.255.0 ! interface Ethernet0 ip
address 10.0.0.1 255.255.255.0 ! !--- Interface virtual-
template is a logical interface which creates !---
virtual access interfaces dynamically and applies them
to physical !--- asynchronous interfaces. interface
Virtual-Template1 ip unnumbered Loopback0 ppp
authentication chap !--- Enables multilink PPP on the
virtual template interface. ppp multilink ! !--- The
parameters configured in interface group-async are !---
applied to the group and range reduces the repeated
configuration !--- in asynchronornous interfaces.
interface Group-Async0 ip unnumbered Loopback0
```

```

encapsulation ppp async default routing !--- Permits
routing over the async interface. !--- This is required
for a routing protocol to run across the async link.
async mode dedicated !--- Places the line into dedicated
asynchronous network mode. !--- This interface is now
automatically configured for PPP connections. ppp
authentication chap ppp multilink group-range 9 10 !---
Group-range indicates the asynchronous interfaces which
comes under !--- the Group-Async interface. ! router
ospf 1 redistribute connected subnets network
192.168.0.0 0.0.0.255 area 0 ! ip classless ! dialer-
list 1 protocol ip permit ! ! line con 0 line 1 8 flush-
at-activation line 9 10 modem InOut modem autoconfigure
type default transport input all autohangup speed 115200
line 11 16 flush-at-activation line aux 0 line vty 0 4
login ! end

```

## 路由器 2 (Cisco 2503)

```

Current configuration : 1645 bytes
!
version 12.2
service timestamps debug datetime msec
service timestamps log datetime msec
!
hostname Router2
!
username Router1 password 0 xxxxx
!--- Username for remote router (Router1) and shared
secret. !--- Shared secret(used for CHAP authentication)
must be the same on both sides. ip subnet-zero ! chat-
script test "" "ATDT\T" TIMEOUT 120 CONNECT \C !--- A
chat script is a string of text that defines the
handshaking that occurs !--- between the router and the
modem to sucessfully handshake with the destination. !--
- In this chat-script called "test" the expected string
"" is !--- the null from the destination. The send
string "ATDT\T" instructs the !--- modem to dial the
telephone number in the dialer string !--- command. This
is 30116 and 30114 in the Interface dialer 3 TIMEOUT 120
CONNECT \C. !--- It waits up to 120 seconds for the
input string "CONNECT". \C is an escape !--- sequence to
end the chat-script. !--- Refer to the Modem-Router
Connection Guide and Chat-script !--- for more
information ! modemcap entry default !--- Modemcap named
"default" will be applied to the line 2 and line 3 of !-
-- Serial interfaces. Refer to the Modem-Router
Connection Guide and !--- modemcap entry for more
information. ! interface Loopback0 ip address
192.168.0.1 255.255.255.0 ! interface Ethernet0 ip
address 172.16.1.1 255.255.255.0 ! ! interface Serial2
physical-layer async no ip address encapsulation ppp
dialer in-band dialer rotary-group 3 !--- Dialer rotary-
group applies the the logical interface dialer 3 !---
configuration to physical serial Interfaces 2 and 3.
This simplifies the !--- configuration, else the
commands in interface dialer has to be repeatedly !---
configured in physical interfaces. async mode dedicated
! interface Serial3 physical-layer async no ip address
encapsulation ppp dialer in-band dialer rotary-group 3
dialer-group 1 async default routing async mode
dedicated ! interface Dialer3 ! -- This is a logical
interface applied to dialer rotary-group. ip unnumbered

```

```

Loopback0 encapsulation ppp dialer in-band dialer idle-
timeout 60 dialer map ip 192.168.0.2 name Router1 modem-
script test broadcast 30116 dialer map ip 192.168.0.2
name Router1 modem-script test broadcast 30114 !---
dialer map statements for the remote router Router1 !---
The name must match the one used by the remote router to
identify itself. !--- use modem chat script "test" for
this connection dialer hold-queue 15 dialer load-
threshold 1 either dialer-group 1 no cdp enable ppp
authentication chap ppp multilink ! router ospf 1
redistribute connected subnets network 192.168.0.0
0.0.0.255 area 0 ! ip classless ! dialer-list 1 protocol
ip permit !--- All IP traffic is defined interesting. !-
-- This is applied to Async interface 2 and 3 using
dialer-group 1. ! line con 0 line 2 3 modem InOut
modem autoconfigure type default !--- Apply the modemcap
"default" (configured previously) to !--- initialize the
modem. Refer to the link Modem-Router Connection Guide
!--- for more information. transport input all !---
Allows all protocols to be passed to the access server
!--- through the line. autohangup !--- Disconnects the
line automatically after the connection closes. speed
115200 line aux 0 line vty 0 4 login ! end

```

要实施此配置，您必须进行以下配置：

- 在路由器 1 上创建一个多链路虚拟模板号码。
- 在这两个路由器上的接口下配置 **ppp 多链路**。
- 在两个路由器的接口下配置身份验证。

在本文档中使用的配置中，路由器 1 配置为仅接听电话，路由器 2 发起通话并连接至路由器 1。两个路由器都进行了多链路 PPP 配置。当连接运行时，系统将创建主捆绑，并且两个异步链路将捆绑在一个虚拟接入接口下。

路由器 1 上的接口 9 和 10 仅接收异步呼叫。当接口 9 和 10 作为 group-async 1 的组成部分时，看不见它们是很正常的。确保创建多链路虚拟模板；否则，第一个信道上也许能进行连接，但是不会传递流量（IP 控制协议 [IPCP] 已关闭）。没有虚拟模板和多链路 PPP 的情况下，此配置可用于一个异步连接，但不能同时用于两个连接。

路由器 2 上的接口 2 和 3 配置了 **physical-layer async** 命令，且会接受多链路 PPP 命令。这些接口变为拨号循环组的一部分时，将被自动移除。输入 **dialer rotary-group 3** 命令之后，**serial ppp multilink** 命令会立即从配置中删除。请改用接口 dialer 3 下的 **ppp multilink** 命令。

## 验证

本部分所提供的信息可用于确认您的配置是否正常工作。

[命令输出解释程序工具](#)（[仅限注册用户](#)）支持某些 **show** 命令，使用此工具可以查看对 **show** 命令输出的分析。

```
Router1#show ip route
```

```

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area

```

\* - candidate default, U - per-user static route, o - ODR  
P - periodic downloaded static route

Gateway of last resort is not set

```
172.16.0.0/24 is subnetted, 1 subnets
O E2 172.16.1.0 [110/20] via 192.168.0.1, 00:32:54, Virtual-Access1
10.0.0.0/24 is subnetted, 1 subnets
C 10.0.0.0 is directly connected, Ethernet0
192.168.0.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.0.0/24 is directly connected, Loopback0
C 192.168.0.1/32 is directly connected, Virtual-Access1
```

Router1#show ppp multilink

Virtual-Access1, bundle name is Router2

```
! --- Virtualized MP bundle. Bundle name is derived from the username used !--- during
authentication Bundle up for 00:34:48 0 lost fragments, 0 reordered, 0 unassigned 0 discarded, 0
lost received, 1/255 load 0xC8 received sequence, 0xC8 sent sequence Member links: 2 (max not
set, min not set)
Async9, since 00:34:52, last rcvd seq 0000C6
Async10, since 00:32:11, last rcvd seq 0000C7
```

Router2#show ip route

```
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route
```

Gateway of last resort is not set

```
172.16.0.0/24 is subnetted, 1 subnets
C 172.16.1.0 is directly connected, Ethernet0
10.0.0.0/24 is subnetted, 1 subnets
O E2 10.0.0.0 [110/20] via 192.168.0.2, 00:45:10, Dialer3
192.168.0.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.0.0/24 is directly connected, Loopback0
C 192.168.0.2/32 is directly connected, Dialer3
```

Router2#show ppp multilink

Virtual-Access1, bundle name is Router1

```
!--- Virtualized MP bundle. Bundle name is derived from the username used !--- during
authentication. Bundle up for 00:35:10 Dialer interface is Dialer3 !--- This Virtual Access
Interface used Interface Dialer3. 0 lost fragments, 0 reordered, 0 unassigned 0 discarded, 0
lost received, 1/255 load 0xC9 received sequence, 0xCA sent sequence Member links: 2 (max not
set, min not set)
Serial3, since 00:35:10, last rcvd seq 0000C8
Serial2, since 00:32:29, last rcvd seq 0000C7
```

Router1#show caller

| Line   | User    | Service | Active Time | Idle Time |
|--------|---------|---------|-------------|-----------|
| con 0  | -       | TTY     | 00:12:03    | 00:00:00  |
| tty 2  | -       | TTY     | 1d08h       | 00:00:00  |
| tty 4  | -       | TTY     | 1d08h       | 00:00:00  |
| tty 9  | Router2 | Async   | 00:43:17    | 00:00:05  |
| tty 10 | Router2 | Async   | 00:40:36    | 00:00:15  |

```
!--- First connection As9 Router2 PPP 00:43:13 - !--- Second connection As10 Router2 PPP
00:40:32 - !--- MP bundle !--- Router2 has two async lines, two TTY, and one virtual interface
```

bundle. Vi1 Router2 PPP Bundle 00:43:10 00:00:05 Router2#show caller

| Line  | User    | Service | Active Time | Idle Time |
|-------|---------|---------|-------------|-----------|
| con 0 | -       | TTY     | 00:11:36    | 00:00:00  |
| tty 2 | Router1 | Async   | -           | 00:00:07  |
| tty 3 | Router1 | Async   | -           | 00:00:18  |

! --- Second connection Se2 Router1 PPP 00:39:58 - ! --- First connection Se3 Router1 PPP  
00:42:39 - ! --- MP bundle ! --- Router1 has two async lines, two TTY, and one virtual interface  
bundle. Vi1 Router1 PPP Bundle 00:42:39 00:00:01 Router2#show caller user Router1

User: Router1, line tty 2, service Async  
Idle time 00:00:16

| Timeouts:      | Absolute | Idle Session | Idle Exec |
|----------------|----------|--------------|-----------|
| Limits:        | -        | -            | 00:10:00  |
| Disconnect in: | -        | -            | -         |

TTY: Line 2, running PPP on Se2

Line: Baud rate (TX/RX) is 115200/115200, no parity, 2 stopbits, 8 databits

Status: Ready, Active, Async Interface Active, Modem Detected

Capabilities: Modem Callout, Modem RI is CD,

Line is permanent async interface, Hangup on Last Close

Modem Autoconfigure

Modem State: Ready, Modem Configured

User: Router1, line tty 3, service Async  
Idle time 00:00:08

| Timeouts:      | Absolute | Idle Session | Idle Exec |
|----------------|----------|--------------|-----------|
| Limits:        | -        | -            | 00:10:00  |
| Disconnect in: | -        | -            | -         |

TTY: Line 3, running PPP on Se3

Line: Baud rate (TX/RX) is 115200/115200, no parity, 2 stopbits, 8 databits

Status: Ready, Active, Async Interface Active, Modem Detected

Capabilities: Modem Callout, Modem RI is CD,

Line is permanent async interface, Hangup on Last Close

Modem Autoconfigure

Modem State: Ready, Modem Configured

**User: Router1, line Se2, service PPP**

Active time 23:14:47, Idle time 00:00:00

| Timeouts:      | Absolute | Idle |
|----------------|----------|------|
| Limits:        | -        | -    |
| Disconnect in: | -        | -    |

PPP: LCP Open, **multilink Open**, CHAP (local <--> local)

Dialer: Connected to 30116, outbound

Type is IN-BAND ASYNC, group Di3

**Cause: Multilink bundle overloaded**

IP: Local 192.168.0.1

Bundle: Member of Router1, last input 00:00:01

Counts: 10194 packets input, 769456 bytes, 0 no buffer

0 input errors, 0 CRC, 0 frame, 0 overrun

10247 packets output, 773761 bytes, 0 underruns

0 output errors, 0 collisions, 31 interface resets

**User: Router1, line Se3, service PPP**

Active time 23:17:30, Idle time 00:00:01

| Timeouts:      | Absolute | Idle |
|----------------|----------|------|
| Limits:        | -        | -    |
| Disconnect in: | -        | -    |

PPP: LCP Open, **multilink Open**, CHAP (local <--> local)

Dialer: Connected to 30116, outbound

Type is IN-BAND ASYNC, group Di3

**Cause: ip (s=192.168.0.1, d=224.0.0.5)**

IP: Local 192.168.0.1

```
Bundle: Member of Router1, last input 00:00:00
Counts: 10432 packets input, 783562 bytes, 0 no buffer
        0 input errors, 0 CRC, 0 frame, 0 overrun
        10718 packets output, 799155 bytes, 0 underruns
        0 output errors, 0 collisions, 41 interface resets
```

**User: Router1, line Vi1, service PPP Bundle**

Active time 23:17:30, Idle time 00:00:05

```
Timeouts:          Absolute Idle
Limits:            -          00:01:00
Disconnect in:    -          00:00:54
```

*!--- Idle-timeout is 60 seconds(1 Minute).* PPP: LCP Open, **multilink Open**, IPCP

Dialer: Connected to 30116, outbound

Idle timer 60 secs, idle 6 secs

Type is IN-BAND SYNC, group Di3

**IP: Local 192.168.0.1, remote 192.168.0.2**

*!--- IP address assigned to the bundle !--- and loopback address of the remote router.* Bundle:  
First link of Router1, 2 links, last input 00:00:07 Counts: 8622 packets input, 623202 bytes, 0  
no buffer 0 input errors, 0 CRC, 0 frame, 0 overrun 8776 packets output, 618523 bytes, 0  
underruns 0 output errors, 0 collisions, 0 interface resets Router2#**show dialer**

Di3 - dialer type = IN-BAND SYNC NO-PARITY

Load threshold for dialing additional calls is 1

*!--- Load threshold* Idle timer (60 secs), Fast idle timer (20 secs) Wait for carrier (30 secs),  
Re-enable (15 secs) Number of active calls = 2 Dial String Successes Failures Last DNIS Last  
status 30114 3 69 00:41:45 successful 30116 4294967293 75 00:44:00 failed Se2 - dialer type =  
IN-BAND ASYNC NO-PARITY Rotary group 3, priority 0 *!--- Member of interface dialer 3* Idle timer  
(60 secs), Fast idle timer (20 secs) Wait for carrier (30 secs), Re-enable (15 secs) Dialer  
state is multilink member **Dial reason: Multilink bundle overloaded**

*!--- Interface was not the first link in the MP bundle* Connected to 30116 (Router1) *!--- Phone  
number that was dialed* Se3 - dialer type = IN-BAND ASYNC NO-PARITY Rotary group 3, priority 0 *!---  
Member of interface dialer 3* Idle timer (60 secs), Fast idle timer (20 secs) Wait for carrier  
(30 secs), Re-enable (15 secs) Dialer state is multilink member Dial reason: ip (s=192.168.0.1,  
d=224.0.0.5) *!--- Interface was the first link in the bundle, triggered by OSPF ALL !--- Routers  
advrt packet.* Connected to 30116 (Router1) ! --- Phone number that was dialed

## 故障排除

本部分提供的信息可用于对配置进行故障排除。

以下输出获取自思科 2511 和思科 2503 路由器。输出显示思科 2503 向思科 2511 路由器的 PSTN 链路拨号并建立 MP 连接。

```
Router1#debug ppp negotiation
PPP protocol negotiation debugging is on
```

```
Router1#debug vtemplate
Virtual Template debugging is on
```

```
Router1#show debug
PPP:
  PPP protocol negotiation debugging is on
VTEMPLATE:
  Virtual Template debugging is on
```

```
Oct  1 20:15:20.463: As9 LCP: I CONFREQ [Closed] id 81 len 39
Oct  1 20:15:20.463: As9 LCP:   ACCM 0x000A0000 (0x0206000A0000)
Oct  1 20:15:20.467: As9 LCP:   AuthProto CHAP (0x0305C22305)
Oct  1 20:15:20.471: As9 LCP:   MagicNumber 0x57D7985D (0x050657D7985D)
Oct  1 20:15:20.471: As9 LCP:   PFC (0x0702)
Oct  1 20:15:20.475: As9 LCP:   ACFC (0x0802)
```

```
Oct 1 20:15:20.479: As9 LCP: MRRU 1524 (0x110405F4)
Oct 1 20:15:20.479: As9 LCP: EndpointDisc 1 Router2 (0x130A01526F7574657232)
Oct 1 20:15:20.483: As9 LCP: Lower layer not up, Fast Starting
Oct 1 20:15:20.487: As9 PPP: Treating connection as a dedicated line
Oct 1 20:15:20.487: As9 PPP: Phase is ESTABLISHING, Active Open [0 sess, 0 load]
Oct 1 20:15:20.495: As9 LCP: O CONFREQ [Closed] id 52 len 39
Oct 1 20:15:20.499: As9 LCP: ACCM 0x000A0000 (0x0206000A0000)
Oct 1 20:15:20.499: As9 LCP: AuthProto CHAP (0x0305C22305)
Oct 1 20:15:20.503: As9 LCP: MagicNumber 0x078F2456 (0x0506078F2456)
Oct 1 20:15:20.507: As9 LCP: PFC (0x0702)
Oct 1 20:15:20.507: As9 LCP: ACFC (0x0802)
Oct 1 20:15:20.511: As9 LCP: MRRU 1524 (0x110405F4)
Oct 1 20:15:20.515: As9 LCP: EndpointDisc 1 Router1 (0x130A01526F7574657231)
Oct 1 20:15:20.519: As9 LCP: O CONFACK [REQsent] id 81 len 39
Oct 1 20:15:20.523: As9 LCP: ACCM 0x000A0000 (0x0206000A0000)
Oct 1 20:15:20.527: As9 LCP: AuthProto CHAP (0x0305C22305)
Oct 1 20:15:20.527: As9 LCP: MagicNumber 0x57D7985D (0x050657D7985D)
Oct 1 20:15:20.531: As9 LCP: PFC (0x0702)
Oct 1 20:15:20.531: As9 LCP: ACFC (0x0802)
Oct 1 20:15:20.535: As9 LCP: MRRU 1524 (0x110405F4)
Oct 1 20:15:20.539: As9 LCP: EndpointDisc 1 Router2 (0x130A01526F7574657232)
Oct 1 20:15:20.547: %LINK-3-UPDOWN: Interface Async9, changed state to up
Oct 1 20:15:20.695: As9 LCP: I CONFACK [ACKsent] id 52 len 39
Oct 1 20:15:20.699: As9 LCP: ACCM 0x000A0000 (0x0206000A0000)
Oct 1 20:15:20.703: As9 LCP: AuthProto CHAP (0x0305C22305)
Oct 1 20:15:20.707: As9 LCP: MagicNumber 0x078F2456 (0x0506078F2456)
Oct 1 20:15:20.707: As9 LCP: PFC (0x0702)
Oct 1 20:15:20.711: As9 LCP: ACFC (0x0802)
Oct 1 20:15:20.711: As9 LCP: MRRU 1524 (0x110405F4)
Oct 1 20:15:20.715: As9 LCP: EndpointDisc 1 Router1 (0x130A01526F7574657231)
Oct 1 20:15:20.719: As9 LCP: State is Open
Oct 1 20:15:20.723: As9 PPP: Phase is AUTHENTICATING, by both [0 sess, 0 load]
Oct 1 20:15:20.727: As9 CHAP: O CHALLENGE id 45 len 28 from "Router1"
Oct 1 20:15:20.739: As9 CHAP: I CHALLENGE id 40 len 28 from "Router2"
Oct 1 20:15:20.743: As9 CHAP: O RESPONSE id 40 len 28 from "Router1"
Oct 1 20:15:20.899: As9 CHAP: I RESPONSE id 45 len 28 from "Router2"
Oct 1 20:15:20.903: As9 CHAP: I SUCCESS id 40 len 4
Oct 1 20:15:20.919: As9 CHAP: O SUCCESS id 45 len 4
!--- Call is virtualized after authentication Oct 1 20:15:20.923: As9 PPP: Phase is VIRTUALIZED
[0 sess, 1 load]
!--- creation of Virtual access interface 1 Oct 1 20:15:20.935: Vi1 VTEMPLATE: Reuse Vi1,
recycle queue size 0 Oct 1 20:15:20.939: Vi1 VTEMPLATE: Set default settings with ip unnumbered
Oct 1 20:15:21.335: Vi1 VTEMPLATE: Hardware address 0000.0c47.7c6c Oct 1 20:15:21.335: Vi1 PPP:
Phase is DOWN, Setup [0 sess, 1 load] Oct 1 20:15:21.339: Vi1 VTEMPLATE: Has a new cloneblk
vtemplate, now it has vtemplate !--- Banner: Cloning is in progress on virtual access interface
1 Oct 1 20:15:21.347: Vi1 VTEMPLATE: ***** CLONE VACCESS1 ***** Oct 1 20:15:21.351:
Vi1 VTEMPLATE: Clone from Virtual-Templat1
!--- The following configuration of Virtual-template is cloned to the !--- Virtual-access
interface. interface Virtual-Access1 default ip address no ip address encaps ppp ip unnumbered
Loopback0 no ip unnumbered Loopback0 ip addr 192.168.0.2 255.255.255.0 no ip add ip unnumbered
lo 0 ip add 192.168.0.2 255.255.255.0 ip add 192.168.1.2 255.255.255.0 no ip add ip unnumbered
lo 0 end Oct 1 20:15:21.367: As9 IPCP: Packet buffered while building MLP bundle interface Oct 1
20:15:22.319: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async9, changed state to up Oct 1
20:15:23.267: As9 IPCP: Packet buffered while building MLP bundle interface Oct 1 20:15:24.447:
Vi1 VTEMPLATE: Messages from (un)cloning ... 192.168.0.0 overlaps with Loopback0 Oct 1
20:15:24.823: Vi1 VTEMPLATE: Messages from (un)cloning ... 192.168.0.0 overlaps with Loopback0
Oct 1 20:15:24.835: %LINK-3-UPDOWN: Interface Virtual-Access1,
changed state to up
Oct 1 20:15:24.843: Vi1 PPP: Treating connection as a dedicated line
Oct 1 20:15:24.847: Vi1 PPP: Phase is ESTABLISHING, Active Open [0 sess, 1 load]
Oct 1 20:15:24.851: Vi1 LCP: O CONFREQ [Closed] id 1 len 29
Oct 1 20:15:24.855: Vi1 LCP: AuthProto CHAP (0x0305C22305)
Oct 1 20:15:24.859: Vi1 LCP: MagicNumber 0x078F3560 (0x0506078F3560)
Oct 1 20:15:24.859: Vi1 LCP: MRRU 1524 (0x110405F4)
```



```
Oct 1 20:15:24.863: Vi1 LCP: EndpointDisc 1 Router1 (0x130A01526F7574657231)

Oct 1 20:15:24.879: Vi1 PPP: Phase is UP [0 sess, 1 load]
Oct 1 20:15:24.883: Vi1 IPCP: O CONFREQ [Closed] id 1 len 10
Oct 1 20:15:24.883: Vi1 IPCP: Address 192.168.0.2 (0x0306C0A80002)
! -- Asynchronornous interface 9 is added to the Virtual access interface 1 !--- and the name of
the bundle is Router2. Oct 1 20:15:24.891: Vi1 MLP: Added first link As9 to bundle Router2
Oct 1 20:15:24.891: Vi1 PPP: Pending ncpQ size is 2
Oct 1 20:15:24.895: As9 IPCP: Redirect packet to Vi1
Oct 1 20:15:24.895: Vi1 IPCP: I CONFREQ [REQsent] id 1 len 10
Oct 1 20:15:24.899: Vi1 IPCP: Address 192.168.0.1 (0x0306C0A80001)
Oct 1 20:15:24.903: Vi1 IPCP: O CONFACK [REQsent] id 1 len 10
Oct 1 20:15:24.907: Vi1 IPCP: Address 192.168.0.1 (0x0306C0A80001)
Oct 1 20:15:24.911: As9 IPCP: Redirect packet to Vi1
Oct 1 20:15:24.915: Vi1 IPCP: I CONFREQ [ACKsent] id 2 len 10
Oct 1 20:15:24.919: Vi1 IPCP: Address 192.168.0.1 (0x0306C0A80001)
Oct 1 20:15:24.919: Vi1 IPCP: O CONFACK [ACKsent] id 2 len 10
Oct 1 20:15:24.923: Vi1 IPCP: Address 192.168.0.1 (0x0306C0A80001)
Oct 1 20:15:25.007: Vi1 IPCP: I CONFACK [ACKsent] id 1 len 10
!--- IP address of virtual bundle was previously obtained from the loopback !--- interface. Oct
1 20:15:25.011: Vi1 IPCP: Address 192.168.0.2 (0x0306C0A80002) Oct 1 20:15:25.015: Vi1 IPCP:
State is Open !--- Adds route for virtual bundle to routing table to reach the remote router.
Oct 1 20:15:25.039: Vi1 IPCP: Install route to 192.168.0.1
Oct 1 20:15:25.947: %LINEPROTO-5-UPDOWN: Line protocol on Interface Virtual-Access1,
changed state to up
Oct 1 20:15:31.199: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.0.1 on Virtual-Access1 from
LOADING to FULL, Loading Done

Oct 1 20:18:01.439: As10 LCP: I CONFREQ [Closed] id 61 len 39
Oct 1 20:18:01.443: As10 LCP: ACCM 0x000A0000 (0x0206000A0000)
Oct 1 20:18:01.447: As10 LCP: AuthProto CHAP (0x0305C22305)
Oct 1 20:18:01.451: As10 LCP: MagicNumber 0x57DA0D94 (0x050657DA0D94)
Oct 1 20:18:01.451: As10 LCP: PFC (0x0702)
Oct 1 20:18:01.455: As10 LCP: ACFC (0x0802)
Oct 1 20:18:01.455: As10 LCP: MRRU 1524 (0x110405F4)
Oct 1 20:18:01.459: As10 LCP: EndpointDisc 1 Router2 (0x130A01526F7574657232)
Oct 1 20:18:01.463: As10 LCP: Lower layer not up, Fast Starting
Oct 1 20:18:01.467: As10 PPP: Treating connection as a dedicated line
Oct 1 20:18:01.467: As10 PPP: Phase is ESTABLISHING, Active Open [0 sess, 0 load]
Oct 1 20:18:01.475: As10 LCP: O CONFREQ [Closed] id 30 len 39
Oct 1 20:18:01.475: As10 LCP: ACCM 0x000A0000 (0x0206000A0000)
Oct 1 20:18:01.479: As10 LCP: AuthProto CHAP (0x0305C22305)
Oct 1 20:18:01.483: As10 LCP: MagicNumber 0x0791992D (0x05060791992D)
Oct 1 20:18:01.483: As10 LCP: PFC (0x0702)
Oct 1 20:18:01.487: As10 LCP: ACFC (0x0802)
Oct 1 20:18:01.491: As10 LCP: MRRU 1524 (0x110405F4)
Oct 1 20:18:01.491: As10 LCP: EndpointDisc 1 Router1 (0x130A01526F7574657231)
Oct 1 20:18:01.499: As10 LCP: O CONFACK [REQsent] id 61 len 39
Oct 1 20:18:01.503: As10 LCP: ACCM 0x000A0000 (0x0206000A0000)
Oct 1 20:18:01.507: As10 LCP: AuthProto CHAP (0x0305C22305)
Oct 1 20:18:01.507: As10 LCP: MagicNumber 0x57DA0D94 (0x050657DA0D94)
Oct 1 20:18:01.511: As10 LCP: PFC (0x0702)
Oct 1 20:18:01.511: As10 LCP: ACFC (0x0802)
Oct 1 20:18:01.515: As10 LCP: MRRU 1524 (0x110405F4)
Oct 1 20:18:01.519: As10 LCP: EndpointDisc 1 Router2 (0x130A01526F7574657232)
Oct 1 20:18:01.531: %LINK-3-UPDOWN: Interface Async10, changed state to up
Oct 1 20:18:01.703: As10 LCP: I CONFACK [ACKsent] id 30 len 39
Oct 1 20:18:01.703: As10 LCP: ACCM 0x000A0000 (0x0206000A0000)
Oct 1 20:18:01.707: As10 LCP: AuthProto CHAP (0x0305C22305)
Oct 1 20:18:01.711: As10 LCP: MagicNumber 0x0791992D (0x05060791992D)
Oct 1 20:18:01.715: As10 LCP: PFC (0x0702)
Oct 1 20:18:01.715: As10 LCP: ACFC (0x0802)
Oct 1 20:18:01.719: As10 LCP: MRRU 1524 (0x110405F4)
Oct 1 20:18:01.723: As10 LCP: EndpointDisc 1 Router1 (0x130A01526F7574657231)
```

```
Oct 1 20:18:01.723: As10 LCP: State is Open
Oct 1 20:18:01.727: As10 PPP: Phase is AUTHENTICATING, by both [0 sess, 0 load]
Oct 1 20:18:01.731: As10 CHAP: O CHALLENGE id 25 len 28 from "Router1"
Oct 1 20:18:01.743: As10 CHAP: I CHALLENGE id 30 len 28 from "Router2"
Oct 1 20:18:01.755: As10 CHAP: O RESPONSE id 30 len 28 from "Router1"
Oct 1 20:18:01.851: As10 CHAP: I RESPONSE id 25 len 28 from "Router2"
Oct 1 20:18:01.867: As10 CHAP: O SUCCESS id 25 len 4
Oct 1 20:18:01.879: As10 CHAP: I SUCCESS id 30 len 4
Oct 1 20:18:01.879: As10 PPP: Phase is VIRTUALIZED [0 sess, 0 load]
Oct 1 20:18:01.891: Vi1 MLP: Added link As10 to bundle Router2
Oct 1 20:18:02.899: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async10,
changed state to up
Router1#
```

```
Router2#debug ppp negotiation
PPP protocol negotiation debugging is on
```

```
Router2#debug ppp multilink events
Multilink events debugging is on
```

```
Router2#debug dialer
Dial on demand events debugging is on
```

```
Router2#show debug
  Dial on demand:
  Dial on demand events debugging is on
  PPP:
  PPP protocol negotiation debugging is on
  Multilink events debugging is on
```

```
Oct  2 20:15:07.442: %SYS-5-CONFIG_I: Configured from console by console
Oct  2 20:15:08.038: %LINK-3-UPDOWN: Interface Dialer3, changed state to up
Oct  2 20:15:08.046: Se3 DDR: rotor dialout [priority]
!--- Dialing Reason Oct  2 20:15:08.050: Se3 DDR: Dialing cause ip (s=192.168.0.1, d=224.0.0.5)
!--- Number being dialed Oct  2 20:15:08.054: Se3 DDR: Attempting to dial 30116
Oct  2 20:15:08.058: CHAT3: Attempting async line dialer script
!--- Using chat script "test" for dialout Oct  2 20:15:08.058: CHAT3: Dialing using Modem script:
test & System script: none Oct  2 20:15:08.066: CHAT3: process started Oct  2 20:15:08.070: CHAT3:
Asserting DTR Oct  2 20:15:08.070: CHAT3: Chat script test started !--- Call being established;
note the time elapsed for call setup. Oct  2 20:15:35.814: CHAT3: Chat script test finished,
status = Success Oct  2 20:15:35.830: Di3 IPCP: Install route to 192.168.0.2 ! -- Physical Layer
(Serial Interface) is up. !--- Only now can PPP negotiation begin. Oct  2 20:15:37.818: %LINK-3-
UPDOWN: Interface Serial3, changed state to up
Oct  2 20:15:37.822: Se3 DDR: Dialer statechange to up
Oct  2 20:15:37.822: Se3 DDR: Dialer call has been placed
!--- PPP negotiation begins Oct  2 20:15:37.826: Se3 PPP: Treating connection as a callout !---
PPP Phase is ESTABLISHING. LCP negotiation will now occur Oct  2 20:15:37.826: Se3 PPP: Phase is
ESTABLISHING, Active Open [0 sess, 0 load] !--- Outgoing CONFREQ with Field ID 81 Oct  2
20:15:37.834: Se3 LCP: O CONFREQ [Closed] id 81 len 39
Oct  2 20:15:37.838: Se3 LCP:   ACCM 0x000A0000 (0x0206000A0000)
!--- This router is requesting: ! -- Option: Authentication Protocol, Value: CHAP ! -- Option:
MagicNumber (used to detect loopbacks and is always sent) Oct  2 20:15:37.838: Se3 LCP:
AuthProto CHAP (0x0305C22305)
Oct  2 20:15:37.842: Se3 LCP:   MagicNumber 0x57D7985D (0x050657D7985D)
Oct  2 20:15:37.846: Se3 LCP:   PFC (0x0702)
Oct  2 20:15:37.846: Se3 LCP:   ACFC (0x0802)
! -- Negotiate Maximum Receive Reconstructed Unit (MRRU) ! -- MRRU is the maximum packet size
this end will reconstruct Oct  2 20:15:37.850: Se3 LCP: MRRU 1524 (0x110405F4) Oct  2
20:15:37.854: Se3 LCP: EndpointDisc 1 Router2 (0x130A01526F7574657232) ! -- Incoming CONFREQ. ID
field is 52 Oct  2 20:15:38.162: Se3 LCP: I CONFREQ [REQsent] id 52 len 39 Oct  2 20:15:38.166:
Se3 LCP: ACCM 0x000A0000 (0x0206000A0000) ! -- The peer has requested: ! -- Option:
Authentication Protocol, Value: CHAP ! -- Option: MagicNumber (used to detect loopbacks and is
always sent) Oct  2 20:15:38.166: Se3 LCP: AuthProto CHAP (0x0305C22305) Oct  2 20:15:38.170: Se3
```

LCP: MagicNumber 0x078F2456 (0x0506078F2456) Oct 2 20:15:38.174: Se3 LCP: PFC (0x0702) Oct 2  
20:15:38.174: Se3 LCP: ACFC (0x0802) Oct 2 20:15:38.178: Se3 LCP: MRRU 1524 (0x110405F4) Oct 2  
20:15:38.182: Se3 LCP: EndpointDisc 1 Router1 (0x130A01526F7574657231) ! -- *Outgoing CONFACK for  
message with Field ID 52* Oct 2 20:15:38.186: **Se3 LCP: O CONFACK [REQsent] id 52 len 39**  
Oct 2 20:15:38.190: Se3 LCP: ACCM 0x000A0000 (0x0206000A0000)  
Oct 2 20:15:38.194: **Se3 LCP: AuthProto CHAP (0x0305C22305)**  
Oct 2 20:15:38.198: **Se3 LCP: MagicNumber 0x078F2456 (0x0506078F2456)**  
Oct 2 20:15:38.198: Se3 LCP: PFC (0x0702)  
Oct 2 20:15:38.202: Se3 LCP: ACFC (0x0802)  
Oct 2 20:15:38.202: Se3 LCP: MRRU 1524 (0x110405F4)  
Oct 2 20:15:38.206: Se3 LCP: EndpointDisc 1 Router1  
(0x130A01526F7574657231)  
*! -- Incoming CONFACK for message with Field ID 81* Oct 2 20:15:38.214: Se3 LCP: I CONFACK  
[ACKsent] id 81 len 39 Oct 2 20:15:38.214: Se3 LCP: ACCM 0x000A0000 (0x0206000A0000) Oct 2  
20:15:38.218: **Se3 LCP: AuthProto CHAP (0x0305C22305)**  
Oct 2 20:15:38.222: **Se3 LCP: MagicNumber 0x57D7985D (0x050657D7985D)**  
Oct 2 20:15:38.222: Se3 LCP: PFC (0x0702)  
Oct 2 20:15:38.226: Se3 LCP: ACFC (0x0802)  
*! -- Both sides have CONFACKed the parameters ! -- MRRU of 1524 bytes and the Endpoint  
Discriminator have been negotiated* Oct 2 20:15:38.230: Se3 LCP: MRRU 1524 (0x110405F4) Oct 2  
20:15:38.230: Se3 LCP: EndpointDisc 1 Router2 (0x130A01526F7574657232 *! -- LCP negotiation  
complete and LCP state goes to Open* Oct 2 20:15:38.234: **Se3 LCP: State is Open**  
*! -- PPP Phase is AUTHENTICATING. PPP Authentication occurs now ! -- Two-way authentication will  
be performed (indicated by the both keyword)* Oct 2 20:15:38.238: Se3 PPP: Phase is  
AUTHENTICATING, by both [0 sess, 0 load] *! -- Outgoing CHAP Challenge. ! -- In LCP we had agreed  
upon CHAP as the authentication protocol* Oct 2 20:15:38.238: Se3 CHAP: O CHALLENGE id 40 len 28  
from "Router2" *! -- Incoming Challenge from peer* Oct 2 20:15:38.398: Se3 CHAP: I CHALLENGE id 45  
len 28 from "Router1" *! -- Incoming response from peer* Oct 2 20:15:38.402: Se3 CHAP: I RESPONSE  
id 40 len 28 from "Router1" *! -- Outgoing Response* Oct 2 20:15:38.410: Se3 CHAP: O RESPONSE id  
45 len 28 from "Router2" *! -- CHAP authentication successful* Oct 2 20:15:38.418: Se3 CHAP: O  
SUCCESS id 40 len 4 Oct 2 20:15:38.538: Se3 CHAP: I SUCCESS id 45 len 4 Oct 2 20:15:38.542: Se3  
MLP: Request add link to bundle *! -- Virtualize Se3 ! -- Virtual Access interface will represent  
the MP bundle* Oct 2 20:15:38.542: Se3 PPP: Phase is VIRTUALIZED [0 sess, 1 load] Oct 2  
20:15:38.546: Se3 MLP: Adding link to bundle Oct 2 20:15:38.550: Vi1 PPP: Phase is DOWN, Setup  
[0 sess, 0 load] Oct 2 20:15:38.558: Vi1 PPP: No remote authentication for call-out Oct 2  
20:15:38.566: Vi1 MLP: Added to huntgroup Di3 Oct 2 20:15:38.570: Vi1 MLP: Clone from Di3 Oct 2  
20:15:38.574: %LINK-3-UPDOWN: Interface Virtual-Access1, changed state to up Oct 2 20:15:38.578:  
Vi1 DDR: Dialer statechange to up *! -- Virtual Access Interface is up ! -- Negotiate LCP and PPP  
parameters for Virtual-Access Interface* Oct 2 20:15:38.582: Vi1 DDR: Dialer call has been placed  
Oct 2 20:15:38.586: Vi1 PPP: Treating connection as a callout Oct 2 20:15:38.586: Vi1 PPP: Phase  
is ESTABLISHING, Active Open [0 sess, 0 load] Oct 2 20:15:38.594: Vi1 LCP: O CONFREQ [Closed] id  
1 len 29 Oct 2 20:15:38.594: Vi1 LCP: AuthProto CHAP (0x0305C22305) Oct 2 20:15:38.598: Vi1 LCP:  
MagicNumber 0x57D79B57 (0x050657D79B57) Oct 2 20:15:38.602: Vi1 LCP: MRRU 1524 (0x110405F4) Oct  
2 20:15:38.606: Vi1 LCP: EndpointDisc 1 Router2 (0x130A01526F7574657232 Oct 2 20:15:38.614: Vi1  
PPP: Phase is UP [0 sess, 0 load] Oct 2 20:15:38.618: Vi1 IPCP: O CONFREQ [Closed] id 1 len 10  
Oct 2 20:15:38.622: Vi1 IPCP: Address 192.168.0.1 (0x0306C0A80001) *! -- First multilink  
connection is brought up in the virtual access interface* Oct 2 20:15:38.626: **Vi1 MLP: Added  
first link Se3 to bundle Router1**  
Oct 2 20:15:38.630: Di3 IPCP: Remove route to 192.168.0.2  
Oct 2 20:15:39.542: %LINEPROTO-5-UPDOWN: **Line protocol on Interface Serial3,  
changed state to up**  
Oct 2 20:15:39.614: %LINEPROTO-5-UPDOWN: **Line protocol on Interface  
Virtual-Access1, changed state to up**  
Oct 2 20:15:40.614: Vi1 IPCP: TIMEOUT: State REQsent  
Oct 2 20:15:40.618: Vi1 IPCP: O CONFREQ [REQsent] id 2 len 10  
Oct 2 20:15:40.618: Vi1 IPCP: Address 192.168.0.1 (0x0306C0A80001)  
Oct 2 20:15:41.046: Vi1 MLP: Load (1) above threshold in bundle Router1  
Oct 2 20:15:41.046: Se2 DDR: rotor dialout [priority]  
Oct 2 20:15:41.050: Se2 DDR: Attempting to dial 30116  
Oct 2 20:15:41.054: CHAT2: Attempting async line dialer script  
Oct 2 20:15:41.054: CHAT2: Dialing using Modem script:  
test & System script: none  
Oct 2 20:15:41.062: CHAT2: process started  
Oct 2 20:15:41.066: CHAT2: Asserting DTR

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Oct 2 20:15:41.066: CHAT2: Chat script test started
Oct 2 20:15:42.506: Vi1 IPCP: I CONFREQ [REQsent] id 1 len 10
Oct 2 20:15:42.510: Vi1 IPCP: Address 192.168.0.2 (0x0306C0A80002)
Oct 2 20:15:42.514: Vi1 IPCP: O CONFACK [REQsent] id 1 len 10
Oct 2 20:15:42.518: Vi1 IPCP: Address 192.168.0.2 (0x0306C0A80002)
Oct 2 20:15:42.530: Vi1 IPCP: I CONFACK [ACKsent] id 1 len 10
Oct 2 20:15:42.534: Vi1 IPCP: Address 192.168.0.1 (0x0306C0A80001)
Oct 2 20:15:42.538: Vi1 IPCP: ID 1 didn't match 2, discarding packet
Oct 2 20:15:42.546: Vi1 IPCP: I CONFACK [ACKsent] id 2 len 10
Oct 2 20:15:42.550: Vi1 IPCP: Address 192.168.0.1 (0x0306C0A80001)
Oct 2 20:15:42.554: Vi1 IPCP: State is Open
Oct 2 20:15:42.562: Vi1 DDR: dialer protocol up
Oct 2 20:15:42.570: Vi1 DDR: Call connected, 4 packets unqueued,
4 transmitted 0 discarded
! -- Adds route for virtual bundle to routing table to reach the remote router Oct 2
20:15:42.582: Di3 IPCP: Install route to 192.168.0.2 Oct 2 20:15:48.714: %OSPF-5-ADJCHG:
Process 1, Nbr 192.168.0.2 on Dialer3
from LOADING to FULL, Loading Done
Oct 2 20:17:41.070: CHAT2: Chat script test finished, status = Connection timed
out; remote host not responding
Oct 2 20:17:41.074: Se2 DDR: disconnecting call
Oct 2 20:17:56.074: Se2 DDR: re-enable timeout
Oct 2 20:17:56.074: Se2 DDR: Attempting to dial 30114
Oct 2 20:17:56.078: CHAT2: Attempting async line dialer script
Oct 2 20:17:56.078: CHAT2: Dialing using Modem script: test & System script:
none
Oct 2 20:17:56.086: CHAT2: process started
Oct 2 20:17:56.090: CHAT2: Asserting DTR
Oct 2 20:17:56.090: CHAT2: Chat script test started
! -- Call is being established; note the time elapsed for call setup Oct 2 20:18:16.890: CHAT2:
Chat script test finished, status = Success Oct 2 20:18:18.894: %LINK-3-UPDOWN: Interface
Serial2, changed state to up
Oct 2 20:18:18.898: Se2 DDR: Dialer statechange to up
Oct 2 20:18:18.898: Se2 DDR: Dialer call has been placed
! -- PPP negotiation begins Oct 2 20:18:18.902: Se2 PPP: Treating connection as a callout Oct 2
20:18:18.906: Se2 PPP: Phase is ESTABLISHING, Active Open [0 sess, 0 load] ! -- LCP negotiation
begins; Multilink parameters are also negotiated Oct 2 20:18:18.910: Se2 LCP: O CONFREQ [Closed]
id 61 len 39 Oct 2 20:18:18.914: Se2 LCP: ACCM 0x000A0000 (0x0206000A0000) Oct 2 20:18:18.918:
Se2 LCP: AuthProto CHAP (0x0305C22305) Oct 2 20:18:18.918: Se2 LCP: MagicNumber 0x57DA0D94
(0x050657DA0D94) Oct 2 20:18:18.922: Se2 LCP: PFC (0x0702) Oct 2 20:18:18.926: Se2 LCP: ACFC
(0x0802) ! -- Negotiate Maximum Receive Reconstructed Unit (MRRU) ! -- MRRU is the maximum
packet size this end will reconstruct Oct 2 20:18:18.926: Se2 LCP: MRRU 1524 (0x110405F4) Oct 2
20:18:18.930: Se2 LCP: EndpointDisc 1 Router2 (0x130A01526F7574657232) Oct 2 20:18:19.142: Se2
LCP: I CONFREQ [REQsent] id 30 len 39
Oct 2 20:18:19.146: Se2 LCP: ACCM 0x000A0000 (0x0206000A0000)
Oct 2 20:18:19.146: Se2 LCP: AuthProto CHAP (0x0305C22305)
Oct 2 20:18:19.150: Se2 LCP: MagicNumber 0x0791992D (0x05060791992D)
Oct 2 20:18:19.154: Se2 LCP: PFC (0x0702)
Oct 2 20:18:19.154: Se2 LCP: ACFC (0x0802)
Oct 2 20:18:19.158: Se2 LCP: MRRU 1524 (0x110405F4)
Oct 2 20:18:19.162: Se2 LCP: EndpointDisc 1 Router1
(0x130A01526F7574657231)
Oct 2 20:18:19.166: Se2 LCP: O CONFACK [REQsent] id 30 len 39
Oct 2 20:18:19.170: Se2 LCP: ACCM 0x000A0000 (0x0206000A0000)
Oct 2 20:18:19.174: Se2 LCP: AuthProto CHAP (0x0305C22305)
Oct 2 20:18:19.174: Se2 LCP: MagicNumber 0x0791992D (0x05060791992D)
Oct 2 20:18:19.178: Se2 LCP: PFC (0x0702)
Oct 2 20:18:19.178: Se2 LCP: ACFC (0x0802)
Oct 2 20:18:19.182: Se2 LCP: MRRU 1524 (0x110405F4)
Oct 2 20:18:19.186: Se2 LCP: EndpointDisc 1 Router1
(0x130A01526F7574657231)
Oct 2 20:18:19.194: Se2 LCP: I CONFACK [ACKsent] id 61 len 39
Oct 2 20:18:19.198: Se2 LCP: ACCM 0x000A0000 (0x0206000A0000)
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Oct 2 20:18:19.198: Se2 LCP: AuthProto CHAP (0x0305C22305)
Oct 2 20:18:19.202: Se2 LCP: MagicNumber 0x57DA0D94 (0x050657DA0D94)
Oct 2 20:18:19.206: Se2 LCP: PFC (0x0702)
Oct 2 20:18:19.206: Se2 LCP: ACFC (0x0802)
Oct 2 20:18:19.210: Se2 LCP: MRRU 1524 (0x110405F4)
Oct 2 20:18:19.214: Se2 LCP: EndpointDisc 1 Router2
(0x130A01526F7574657232)
Oct 2 20:18:19.214: Se2 LCP: State is Open
Oct 2 20:18:19.218: Se2 PPP: Phase is AUTHENTICATING, by both [0 sess, 0 load]
Oct 2 20:18:19.222: Se2 CHAP: O CHALLENGE id 30 len 28 from "Router2"
Oct 2 20:18:19.358: Se2 CHAP: I CHALLENGE id 25 len 28 from "Router1"
Oct 2 20:18:19.362: Se2 CHAP: O RESPONSE id 25 len 28 from "Router2"
Oct 2 20:18:19.382: Se2 CHAP: I RESPONSE id 30 len 28 from "Router1"
Oct 2 20:18:19.390: Se2 CHAP: O SUCCESS id 30 len 4
Oct 2 20:18:19.482: Se2 CHAP: I SUCCESS id 25 len 4
Oct 2 20:18:19.486: Se2 MLP: Request add link to bundle
Oct 2 20:18:19.486: Se2 PPP: Phase is VIRTUALIZED [0 sess, 0 load]
!--- Virtualize Se2 !--- Virtual Access interface will represent the MP bundle Oct 2
20:18:19.490: Se2 MLP: Adding link to bundle
!--- Second multilink connection is virtualized and added to Virtual !--- access interface. Oct
2 20:18:19.494: Se2 IPCP: Route to 192.168.0.2 still needed by Vi1 Oct 2 20:18:19.498: DDR: MLP
bundle, 0 packets unqueued and discarded Oct 2 20:18:19.498: Vi1 MLP: Added link Se2 to bundle
Router1 Oct 2 20:18:20.482: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2,
changed state to up
```

## 故障排除命令

[命令输出解释程序工具](#) ( [仅限注册用户](#) ) 支持某些 **show** 命令，使用此工具可以查看对 **show** 命令输出的分析。

**注意：** 在发出 **debug** 命令之前，请参阅[有关 Debug 命令的重要信息](#)。

- **debug ppp negotiation** - 用于查看客户端是否正在传递 PPP 协商；此命令用于检查地址协商。
- **debug ppp authentication** - 看见客户端是否可以认证。如果您使用的是 11.2 之前的 Cisco IOS 软件版本，请改用 **debug ppp chap** 命令。
- **debug ppp error** - 显示和 PPP 连接协商与操作相关的协议错误以及统计错误。
- **debug vtemplate** - 用于显示虚拟模板克隆以形成虚拟访问接口。
- **debug ppp multilink events** - 用于查看 PPP 多链路事件调试。显示与影响多链路组的事件有关的信息。
- **debug dialer** - 用于显示关于拨号接口上接收的数据包的调试信息。
- **show caller** - 显示连接的统计或调试信息。
- **show dialer** - 显示为 DDR 配置的接口的一般诊断信息。
- **show caller user** - 显示关于哪个用户在使用哪个调制解调器端口的列表。
- **show ppp multilink** - 用于查看多链路捆绑的成员。

## 相关信息

- [对基本拨号接入进行NAS配置](#)
- [配置旧版 DDR 集线器](#)
- [显示呼叫方统计信息](#)
- [多链路PPP RFC 1717 多链路PPP RFC 1717](#)
- [配置带有拨号配置文件的点到点DDR](#)
- [接入技术支持页面](#)

- [技术支持 - Cisco Systems](#)